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In re Application of:

CAROLYN C. FAOUR et al.

Serial No. **To be Assigned**

Filed: **HEREWITH**

For: **SYSTEM AND METHOD FOR HANDLING A UNIT OF WORK**

TRANSMITTAL

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Sir:

Enclosed find:

1. Transmittal with Certificate of Mailing
2. Patent Application
3. Informal drawings
4. Our firm check in the amount of $710.00
5. Our return postcard, which we would appreciate your date-stamping and returning to us upon receipt.

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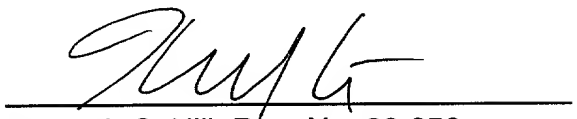
Respectfully submitted,



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SPECIFICATION

Docket No. 0544MH-40015

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that we, Carolyn Faour, Paul Anderson, and Avi Bedi, residing in the State of Texas, have invented new and useful improvements in a

SYSTEM AND METHOD FOR HANDLING A UNIT OF WORK

of which the following is a specification:

CROSS REFERENCE TO RELATED APPLICATION

The present application claims the benefit of priority of US Provisional application No. 60/158,729, filed October 11, 1999, titled COMMON FRAMEWORK FOR SYSTEMS THAT MANAGE A UNIT OF WORK THROUGH ITS LIFE CYCLE.

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates generally to computer systems, and more specifically to a system and method for handling a work item within the system during that item's lifetime.

2. Description of the Prior Art:

Numerous techniques are used to manage work that is to be performed. How that work is handled depends in part upon the nature of the work. In some applications, a single work item is worked upon by several different entities, human or automated systems, at different times. Work of this type is difficult for existing system to deal with, because keeping up with the work item and its status is not provided for.

An example of such a system would be one associated with a "help desk", in which requests for assistance are submitted by users, and addressed at various times by technicians. When a user submits a request for assistance, that

request must be tracked as it passes through the system set up to deal with it. Such a request may be dealt with by a single technician, or it may be routed to one or more specialists for additional assistance. Such requests are sometimes referred to as "trouble tickets" in some industries. The trouble ticket must be maintained, and its status ascertained, until a response to the request is completed.

Most computer systems have trouble gracefully handling this type of work item. In many cases, dedicated code must be written to enable these items to be tracked and handled. This is inefficient, because systems that deal with such work items have many features in common.

It would be desirable to provide a system that enabled work items of this type to be easily handled. It would further be desirable for such a system to be generic enough that the numerous different business systems could use a single support system.

SUMMARY OF THE INVENTION

In accordance with the present invention, a system and method for handling work items creates a work item object for each work item entered into the system. Each object maintains information regarding its state, and its type. Work items are maintained in queues, and each work item contains information identifying the queue it is in. Business processes, which may be controlled by people or automated modules, take items from queues, and perform actions on them. Actions modify the state of an item, and can alter its data. An item persists until the work it represents is completed.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself however, as well as a preferred mode of use, further objects and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 is a block diagram illustrating a preferred common workflow domain;

Figure 2 is a table identifying the contents of a preferred work item;

Figure 3 is a diagram depicting a preferred composite action;

Figure 4 is a flowchart outlining a process for handling work items; and

Figure 5 is a block diagram illustrating data flows in a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As will be appreciated by those skilled in the art, the detailed implementation of the preferred embodiment can be made in numerous ways. Preferably, an object oriented environment is used, as it easily represents the various objects and methods described below. However, the described system and method can be used with systems of various types.

The following discussion can be better understood with reference to an example. The invention is not limited to a system implementing the described example, but it is used for explanatory purposes only.

In a business that assists users with questions regarding products they have purchased, some technique is needed to track the status of numerous inquiries. One approach is to provide a "trouble ticket," a document that is passed around containing the history of resolving the help request, and other information relevant to the request. This can be conceptualized as a physical document, a piece of paper, but is implemented as objects in a computer system domain.

The trouble ticket, referred to herein generically as a "work item," is preferably an object in an object oriented computer system. A new work item is created when a help request is first made, and exists until the request is completely resolved. The work item can change state, be passed to various personnel at various locations for handling, and can be modified at various stages. IN addition,

actions can be performed at various stages along the way that are not related to modifying the work item itself.

As an example, a user can contact a help line via a web page accessed over the internet. The user selects a category of problem being encountered, such as a hardware problem with a certain brand of laser printer. A description of the problem can be entered by a simple text description, or as a series or responses to questions posed. When the user has entered the required information, including identification of the user, a work item is generated that must be routed to technical support and responded to.

The work item can be placed into a queue for technical support for that particular hardware. Eventually a technician takes the work item from the queue, and determines whether the problem can be answered based on the information given. If not, additional handling may be required, or the technician may need to call or otherwise contact the customer for further information. The work item may need to be routed between several different people, even several different companies, before it is resolved. Once the problem has been solved, which can include on-site repair or replacement, the work item is completed and archived.

The preferred system handles the work item and its routing in a manner that is generic and can be used for numerous different business processes. Implemented as a software system running on a computer system, Figure 1 illustrates a preferred domain for the system. Domain 10 allows access through interface 12, which is the published set of methods by which the domain can be

accessed. Contained within the domain are a number of composite actions 16, described below, and work items 16. Numerous other support and other modules and objects are included in domain 10 as known in the art, but the composite actions 14 and work items 16 are of primary conceptual interest. All access to the work items 16 is through the defined interface 12.

Figure 2 describes the parts of a work item 16. Each work item 16 has a Category, which is used to determine, in part, how the work item 16 is handled. Each work item has a State, which indicates where the work item 16 is in the business process flow. Typical states could include new, pending, awaiting follow up, completed, and so forth. A State indicates whether the work item 16 is open or closed. An open item has been locked by a handler process, and work is being done on it. A closed item is waiting in a queue for work to be performed.

Each work item 16 has a Location. All work items must be located in a queue, and the location identifies the queue the work item 16 is in. The Creator and Responsible fields indicate who created the work item 16, and who is responsible for dealing with it. The Responsible field can change during the course of handling the work item. The Due field, which may not be used in some cases, indicates when the problem represented by the work item must be resolved. This information can be used to, among other tings, prioritize work items in a queue.

The History filed contains a history of all actions that have been undertaken on this work item 16. Each time the item is amended in any way, or moved to a different queue, the history field is updated. By reviewing the History entry at any

time, the compete sequence of events relating to this work item 16 can be recreated. The Description field includes a definition of the problem represented by the work item, and can include text and coded indicators.

Figure 3 shows a composite action 14. Each composite action 14 contains a rule, which is a Boolean expression that gives an answer of True or False. The rule can be omitted. By linking a series of composite actions together in sequence, nearly any business process can be defined by using composite actions 14.

Three sets of actions are provided. A first set 18 is executed by default when the composite action has no rule, or when the rule is not evaluated because of a setting. A second set of actions 20 is executed when the Rule evaluates to True, and a third set of actions 22 is evaluated when the rule evaluates to False. These actions are any which can be executed by the system. Typical actions include sending the work item to a particular queue, sending e-mail or fax messages to the customer or a technician, and similar types of notifications. The actions can be more complex, and initiate various actions to be performed by the system. For example, an action could include access to a database of expert knowledge about a certain problem, followed by display of suggested solutions to a technician.

In the preferred embodiment, each Rule has three possible outcomes. If desired, other outcomes can be accommodated, with multi-way logical branching occurring. Each outcome of the rule evaluation can have a separate set of actions to be executed, in the manner described above.

Figure 4 is a flowchart illustrating the preferred system in action. Initially, a work item is created 30; a trouble ticket in the help desk example described herein. When a work item 16 is created, it is assigned a category. Categories are preferably arranged hierarchically, so that a user can better define the problem by selecting a lower category. In the previous example of a printer hardware problem, high level categories can include, for example, hardware and software problems, with lower levels defining with more precision the type of hardware having the problem and the nature of the problem itself.

Each category has an associated composite action 14. When a work item is initially created, the composite action for the associated category is executed on the work item. Actions may include, for example, an e-mail notification that the work item has been entered, and an estimate of the delay before it will be handled. The work item must be initially placed into a queue, so each possible set of actions for the composite action associated with a category must have an action that places the work item into a queue 32.

At some future time, the work item is extracted from the queue. This can be done by an application executing automatically, or by a person calling up the work item through an application operating on her computer. When a work item is opened, it must be locked so that another application cannot access it. A composite action is executed on the work item 34, as described above.

The composite action can be executed by a technician after reviewing the work item. For example, after a technician opens a work item relating to a

hardware problem with a printer, the technician will take an initial step toward resolving the problem. In some cases, it may only be necessary to send a prepared reply to the customer explaining how to deal with a known, common problem. In others, I may be necessary to initiate a more complicated series of actions to resolve the problem. For example, it may be that the symptoms, although appearing to be hardware related, are actually caused by software. The technician may then need to transfer the work item to a different queue for processing, and send a notification to the customer that this has happened.

The technician accomplishes activities such as this by selecting an appropriate action from a menu or other presentation on her computer display. The selected action then calls the corresponding composite action, which in turn executes the actions according to the result of its rule. As mentioned previously, these actions can include modifying the work item, moving it to a different queue, sending notifications, and so forth. Whenever a composite action is executed, the work item history is updated to reflect all changes.

If the result of the composite action is to change the work item status to complete 36, the work item is closed 38 and archived. If processing of the work item is not yet complete it is placed in a queue for future processing.

The result of a composite action may be to leave the work item in the same queue for future handling, or to move it to a different queue. In either case, processing of e work item is similar. Also, an action in a composite action may be to execute another composite action. This would result in a sequence of two or

more composite actions being executed on the work item with no additional input from a technician or the customer. By defining the composite actions, a complex workflow can be performed on the work item in step 34. Generally, eventually the work item is placed in a queue to await an action or decision to be performed by a person, but this is not a requirement.

Figure 5 illustrates a conceptual data flow that can occur in the system described above. A work item is initially created by an appropriate process 40 as described above. Transport of work items within the common workflow domain is represented by line 42. The work item is placed into one of queues 44, 46, 48. Eventually, it will be picked up by the associated handler 50, 52, 54, respectively, and operated upon. Operations by a handler 50 – 54 include the execution of one or more composite actions. At the end of such execution, the work item is placed into another queue for further processing. As described above, in many cases the processing to be performed by a handler executes as the result of a selection made by a person after deciding how to deal with the work item.

Queue 56 is used for holding work items that are completed, and process 58 finishes the task of completing and archiving completed work items. When the work item has been completely responded to, as defined by the business processes defined by the composite actions, the work item 16 is placed in queue 56 for final disposal.

The described system and method allow for certain types of businesses processes to be efficiently handled in comparison with prior art systems. A trouble

ticket ion connection with a help desk has been described as an example, but numerous other situations are suitable for the system and method of the invention. For example, nearly any customer relationship that requires several different people to wok on could use the described processes. Whenever any piece of work must be handled by different entities at different times, the described system and method can usually be defined to handle the process.

While the invention has been particularly shown and described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A method for handling jobs within a computer system, comprising the steps of:

providing a plurality of work items, each work item representing a job to be performed, each work item including a category, state, and change history;

placing each work item into one of a plurality of queues;

in turn, opening each work item in a queue, and executing one or more tasks on the item; and

after executing the tasks, if the job represented by a work item is complete archiving the work item, and if the job is not yet complete, placing the work item into a queue.

2. The method of Claim 1, wherein the step of executing a task includes the step of modifying the work item.

3. The method of Claim 1, wherein the step of executing a task includes the step of sending an e-mail to a person.

4. The method of Claim 1, wherein the step of executing a task includes the step of sending a fax to a person.

5. The method of Claim 1, wherein the step of executing a task includes the step of moving the work item to a queue different form its present queue.

6. The method of Claim 1, wherein the step of executing one or more tasks comprises the steps of:

providing a plurality of composite actions, each composite action including a rule and at least one task to be executed as a result of evaluation of the rule;

evaluating the rule for a composite action; and

executing the task corresponding to the evaluation of the rule.

7. The method of Claim 1, wherein the work items each further include an identification of a party that created the work item.

8. The method of Claim 1, wherein the work items each further include a description of the job represented by the work item.

9. The method of Claim 1, wherein the work items each further include a due date for the work item.

10. The method of Claim 1, wherein the work items each further include a current location for the work item.

11. A system for handling jobs within a computer system, comprising:

a plurality of queues;

a plurality of work items, each representing a job to be performed, each work item having a category, a state, and a history;

a plurality of composite actions, each defining one or more tasks to be executed with respect to a work item.

12. The system of Claim 11, wherein each composite action includes a rule to be evaluated, and at least two sets of tasks to be performed depending on the outcome of the evaluation.

13. The system of Claim 12, wherein the rule evaluates to a value of true or false.

14. The system of Claim 13, further including a set of rules to be evaluated if there is no rule to be evaluated.

15. The system of Claim 11, wherein the work items each further include an identification of a party that created the work item.

16. The system of Claim 11, wherein the work items each further include a description of the job represented by the work item.

17. The system of Claim 11, wherein the work items each further include a due date for the work item.

18. The system of Claim 11, wherein the work items each further include a current location for the work item.

ABSTRACT

A system and method for handling work items creates a work item object for each work item entered into the system. Each object maintains information regarding its state, and its type. Work items are maintained in queues, and each work item contains information identifying the queue it is in. Business processes, which may be controlled by people or automated modules, take items from queues, and perform actions on them. Actions modify the state of an item, and can alter its data. An item persists until the work it represents is completed.

FIG 1

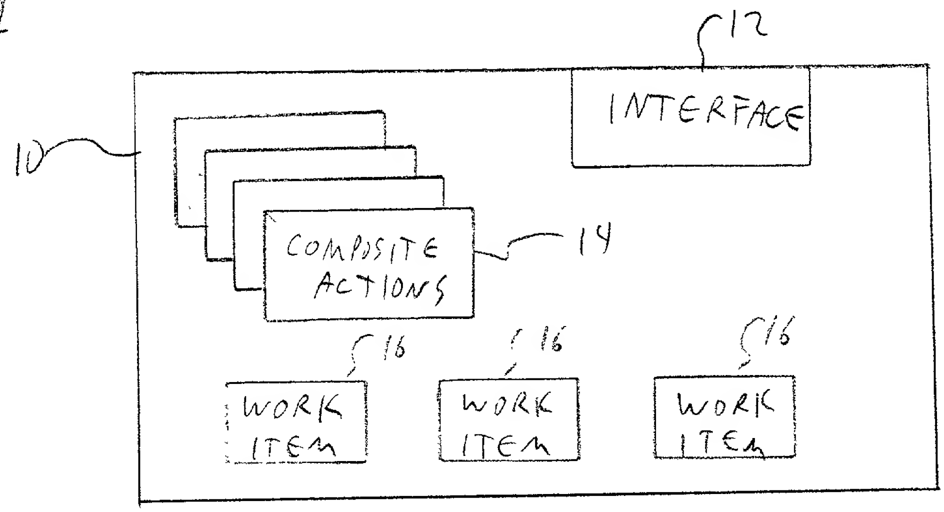


FIG 2

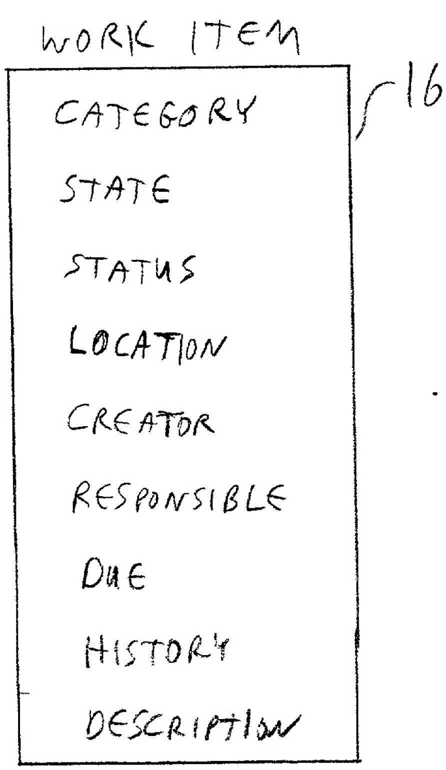


FIG 3

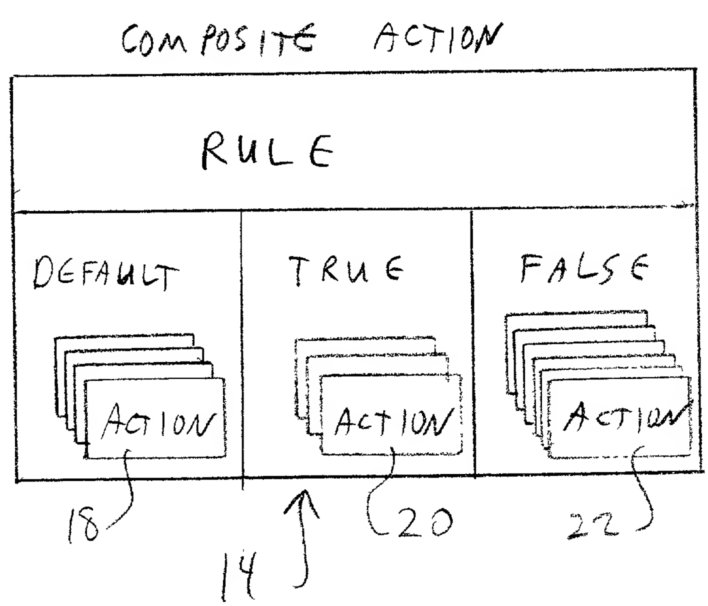


FIG 4

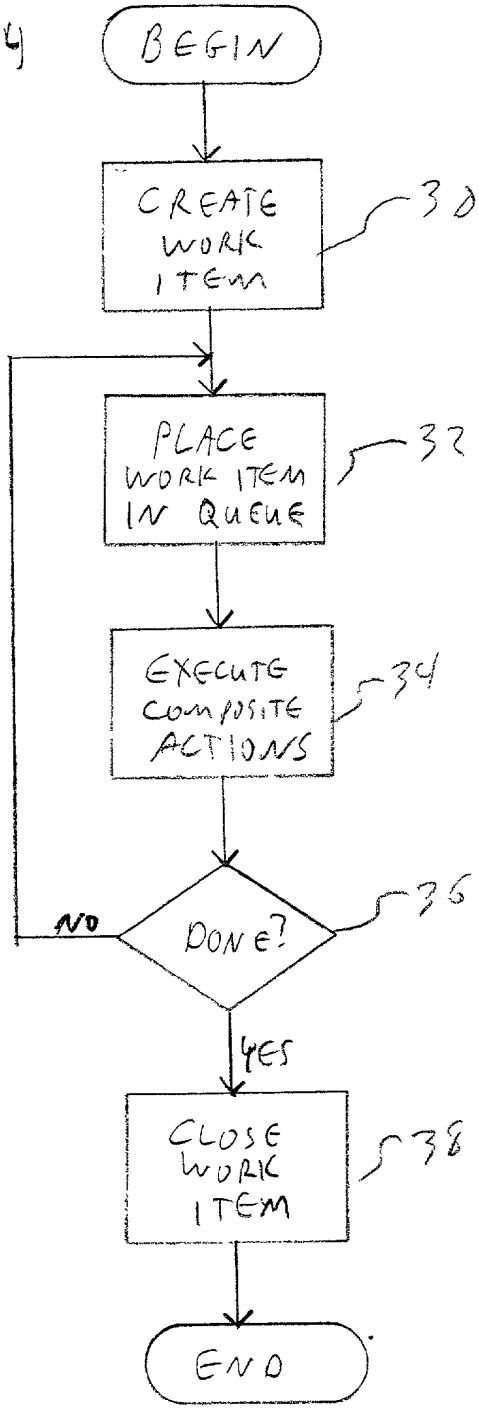
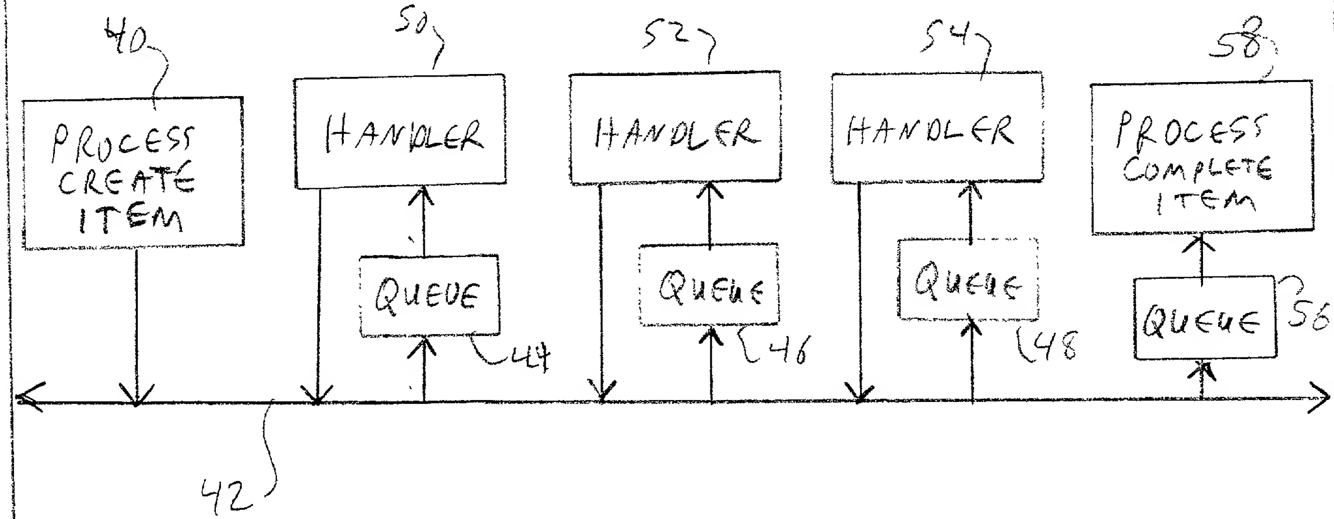


FIG 5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